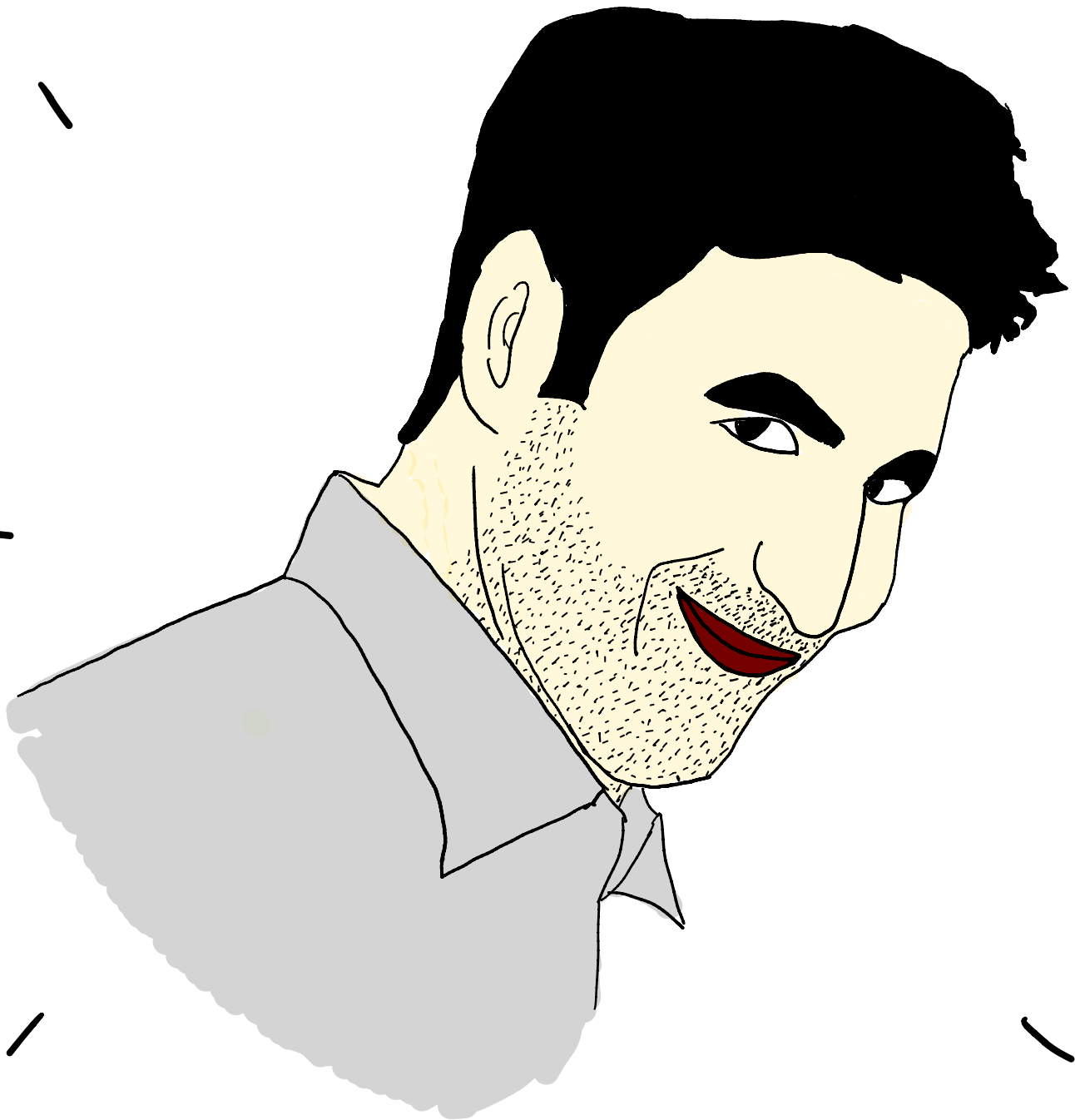


REPRODUCTION

HANDWRITTEN NOTES



Designed with ♥
Shobhit Nirwan

How Do Organisms Reproduce

DNA

- Importance of DNA copying
- Importance of Variation.

Asexual Reproduction

- Fission
- Fragmentation
- Regeneration
- Budding
- Vegetative Propagation
- Spore formation

Sexual Reproduction

- Sexual Reproduction in Flowering Plant
- Sexual Reproduction in Human Beings
 - Puberty
 - Male Reproductive System
 - Female Reproductive System
 - Fertilisation or Sexual Reproduction in Animals
 - Birth Control

Formation of new life from pre-existing life is called **Reproduction**.

It is essential for:

- Replacement of dead organisms.
- Continuation of life on earth.

Mainly there are two types of reproduction — asexual and sexual.

DNA (Deoxyribo Nucleic Acid) :-

The individuals produced by reproduction are similar to each other and their parents. This similarity occurs because of DNA.

Importance of DNA copying:

- Maintenance of body design.
- Transfer of traits.
- Variation are introduced at the time of DNA copying.

Importance of Variation:

Variation ensures species can survive during unfavourable conditions. For eg: If there were a population of bacteria living in temperature water, and the temp. rises suddenly. Most of the bacteria would die but few variants resistant to heat would survive and grow further.

ASEXUAL REPRODUCTION

When offspring is produced by single parent with or without the involvement of gamete formation.

↳ Organism's reproductive cells or sex cells.

↳ Sexual reproduction में और अणु से पेटें।

Modes of Asexual Reproduction:

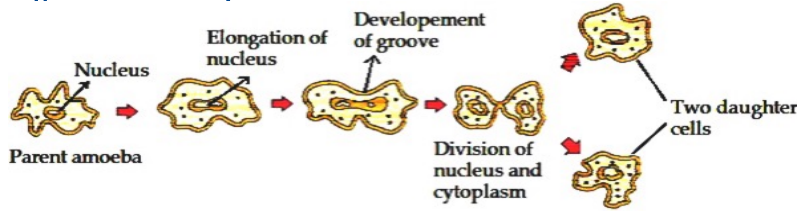
1. Fission
2. Fragmentation
3. Regeneration
4. Budding
5. Vegetative propagation
6. Spore formation.

Fission

↳ A unicellular organism, like bacteria splits into 2 or more organisms. Generally, it is of two types — binary and multiple fission.

Binary fission: In Binary fission, organisms split into 2 new organism under specific condition.

eg:- Binary fission in Amoeba:

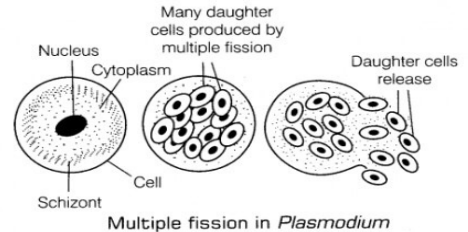


Binary fission in Amoeba

At first the nucleus divides into two. It is followed by division of cytoplasm. Then finally splitting of parent cell into two daughter cells occurs.

Multiple Fission: The parent organism divides into many identical daughter organisms at the same time.

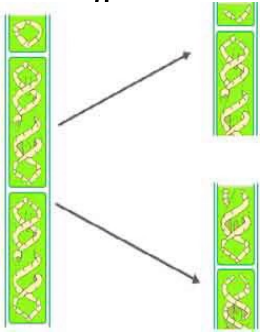
multiple fission can be seen in organisms, such as *Plasmodium* (malarial parasite).



Multiple fission in *Plasmodium*

Fragmentation

The breaking up of body of a simple multicellular organism into 2 or more pieces on maturing, each subsequently to form a new organism is called fragmentation.



eg:- *Algae (Spirogyra)*: These organisms on maturation break up into two or more small fragments or pieces. Each fragment subsequently grows to form a complete new organism.

Regeneration

The process of getting back a full organism from its body part is called regeneration.



Regeneration in *Planaria*

Q³B Why a complex multicellular organism cannot give rise to a complete individual from their cutted body part?

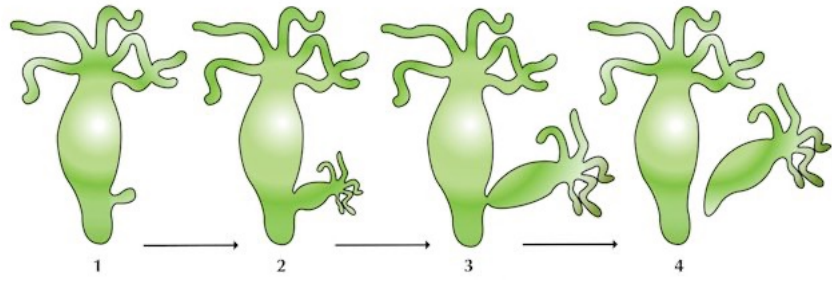
ans: Regeneration can be used only in those organism whose body is relatively simple when compared to organisation of its tissue or cell. But in complex multicellular organism, cell combine to make up tissue, tissue to organ, organ to organ system and finally organ system into organism. This is the reason that complex multicellular organisms cannot form by cutted part.

Budding

In budding, small parts of body of parent organism grow out as "bud" which then detach and form a new organism. eg: *Hydra*, *yeast*.

eg: Hydra:

- Hydra is a simple multicellular organism, it reproduce asexually by process of budding using its regenerative cells.
- First a small bud is formed on one side of its body by simple mitotic division.
- This bud then grows and forms mouth and tentacles.
- Finally the new hydra detach itself from parents body and live as a singular organism.

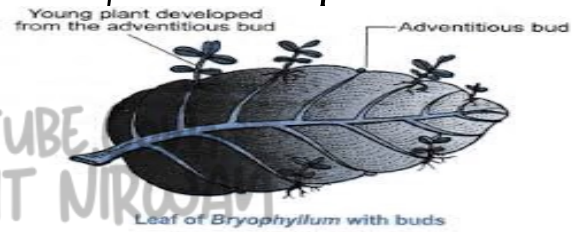


Vegetative Propagation

In vegetative propagation, new plants are obtained from parts of old plants, without the help of reproductive parts. Vegetative propagation usually involves the growth and development of one bud present on an old part of a plant to form a new plant.

eg: Bud of potato, bulb of onions, leaf buds of Bryophyllum, roots of Dahlia.

↳ This is Natural Propagation.



Artificial propagation of plants: A process of growing many plants from one plant by man-made methods is called artificial propagation. Common methods of artificial propagation are:-

- Cutting:** A small part of a plant is removed by cutting it with a sharp knife; this is called cutting. eg: sugarcane, bananas, cactus etc.
- Layering:** A part (generally a branch) of a plant is bent toward the ground, leaving its growing tip, and is covered by soil. eg: Jasmine, lemon etc.
- Grafting:** A method in which the stem of 2 plants (one with roots and one without) are joined and are allowed to grow as a single plant. eg: Apple, pear etc.

Advantages of Artificial propagation of plants:

- New plants will be exactly the same as the parent plant with any desired character of the parent.
- Plants grown by this process need less attention.
- Many plants can be grown by the same parent.

K³B **TISSUE CULTURE**: The production of new plant from a small piece of plant tissue (or cells) removed from an growing plant, which is grown under suitable medium is known as tissue culture.

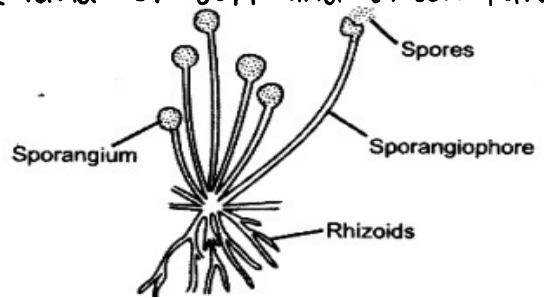
Advantages:

- Its a very fast technique of growing plant.
- Plants produced are disease-free.
- No. of plant produce in few and week of time and takes less space for growth.

Spore formation

In spore formation, the parent plant produce hundred of microscopic reproductive unit called spores. When the spore case of the plant burst, then the spore spread to air, where these air-borne spore land on soil and under favourable condition they germinate into new plants.

eg: Spore formation in Rhizopus:-



SEXUAL REPRODUCTION

Sexual reproduction takes place by combination of 2 special reproductive cells called 'sex cells', they are also called 'gametes' or 'germ cell'.

They are 2 types of sex cell → Male sex cell
Male gamete
Male germ cell

female sex cell
female gamete
female germ cell.

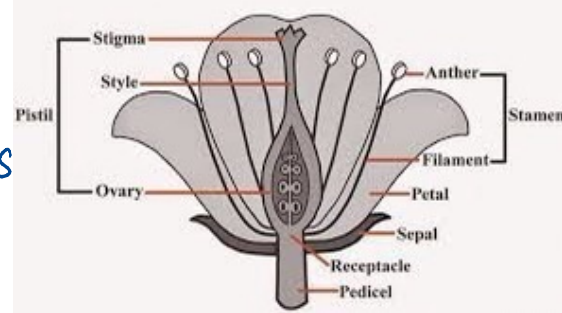
The fusion between male gamete and female gamete led to formation of 'zygote' cell which then develop to a new organism.

Sexual Reproduction in flowering Plant

[Tip: If part theory से देखें तो बड़ा लगे सक्ता है but इस story की तरह पढ़ें ॐ]

The plant in which sex organ are carried by flower, and the seed is enclosed within fruit are called Angiosperms / flowering plants. They bear the reproductive parts within the flower and their seeds are enclosed in a fruit.

Most plants have both male and female reproductive organs in the same flower and are known as bisexual flowers. While others have either male or female reproductive parts in a flower known as unisexual flowers.



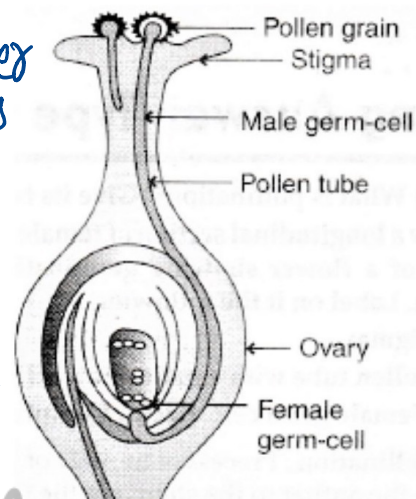
• **Stamen**: It is the male reproduction part of the flower. A single flower may have number of stamens in it.

- **Anther**: It is a bilobed structure containing two pollen sacs present at tip of stamen. These produce pollen grains that are yellowish in colour.
- **Carpel**: (Pistil) It is the female reproductive part, which is present in the centre of the flower. It comprises of mainly three parts:
 - Stigma**: It is the terminal part of carpel which may be sticky. It helps in receiving the pollen grains during pollination.
 - Style**: It is the middle elongated part of carpel. It helps in the attachment of stigma to the ovary.
 - Ovary**: Swollen bottom part of carpel. It contains ovules having an egg cell (female gamete).

- **Pollination**: Transfer of pollen grains from the anther of the stamen to the stigma of a flower is termed as pollination.

Self pollination: pollen from the stamen of a flower is transferred to the stigma of same flower.

Cross pollination: pollen from the stamen of a flower is transferred to the stigma of different flower.



- **Fertilisation**: Pollination is followed by fertilisation in plants. It is the process of fusion of male germ cells with the female gametes. It gives rise to a zygote. As soon as the pollen lands on suitable stigma, it reaches the female germ cells in ovary. This occurs via pollen tube. The pollen tube grows out of the pollen grains, travels through the style and finally reaches the ovary. After fertilisation, the zygote divides many times and forms an embryo within the ovule. This ovule then develops a tough coat and gets converted into a seed. The ovary rapidly grows and ripens as fruit. The seed contains the future embryo that develops into a seedling under suitable conditions. This process is called germination.



Sexual Reproduction in Human Beings

PUBERTY: The age at which 'sex hormones' are produced and a boy or a girl becomes sexually mature is called age of puberty.

Age of puberty for boys → 13-14 yrs
for girls → 10-12 yrs

Testis produce male sex hormone Testosterone and ovaries produce 2 sex hormone oestrogen and progesterone.

In both boys and girls, certain changes take place during this reproductive phase. These changes are the signals of sexual maturation.

Common changes in both:

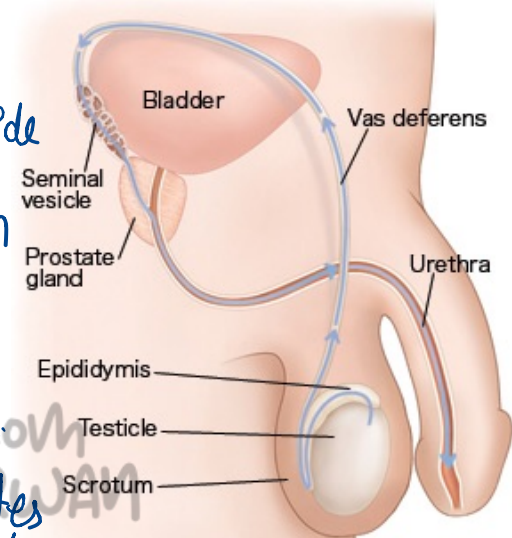
- Growing of thick darker hair in new parts of the body such as armpits and the genital area between thighs.
- Thinner hair on arms and legs, as well as on face.
- The skin frequently becomes oily and begins to develop pimples.

Changes in girls:

- Breast size begins to increase.
- Darkening of the nipple at the tips of breast.
- Start of menstruation.

Male Reproductive System

Testis: Formation of germ cell or sperm. Located outside the abdominal cavity in scrotum because sperm formation requires a lower temperature than the normal body temperature.



* SPERMS are tiny bodies that consists of a long tail that helps them to move towards the female germ cell.

Vas Deferens: Delivers the sperm formed which reunites with a tube coming from urinary bladder.

* Semen = liquid + sperm

Urethra: Common passage for both sperm and urine.

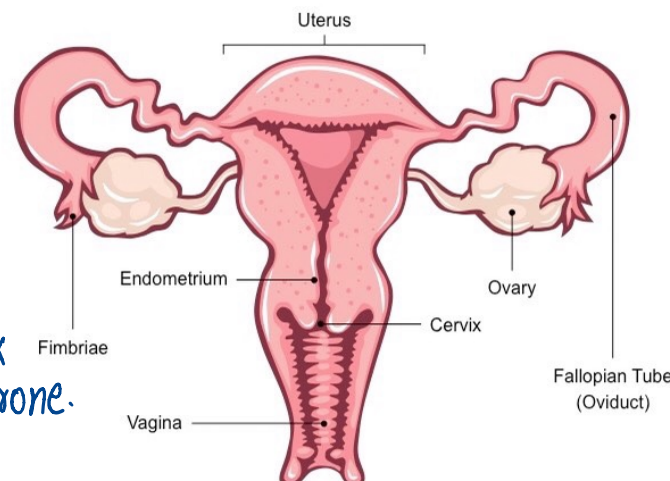
Prostate Gland and Seminal Vesicle: Secretes fluid to make transport easier for the sperm. This fluid also provides nutrition.

Scrotum: small pouch that contains testis. It is present outside abdominal cavity. As sperms are formed here, this requires a lower temperature than the normal body temperature.

Penis: External male genital organ. which transfers sperms into the vagina of the female during copulation.

Female Reproductive System

Ovaries: Paired, oval-shaped organs located in abdominal cavity near kidney. It produces thousands of ova or egg cells. and secrete female sex hormones like oestrogen and progesterone.



Oviduct (fallopian tube): It carries ova or egg from ovary to uterus. It is the site of fertilisation. It has a funnel-shaped opening near the ovary and other opening into uterus from both sides.

Uterus (womb): A Hollow, pear-shaped bag like structure where the growth and development of foetus takes place.

Vagina: It receives sperms from male partner, serves as a birth canal.

Cervix: Lower and the narrower portion of uterus which opens into the vagina.

Fertilisation or Sexual Reproduction in Animals

- The male parent produces sperm whereas female parent produce ovum.
- During copulation sperm enters ovum and fertilization takes place which in result produces first cell of new organism or offspring i.e. Zygote.
- The zygote undergoes various divisions to form an embryo.
- The embryo sinks down and reaches into the soft and thick lining of uterus. The embedding of the embryo in the thick lining of the uterus is known as implantation.
- During pregnancy, the placenta grows into a disc between the uterine wall and the embryo. Placenta forms finger-like projections called villi towards embryo.
- The development of the child inside the mother's body takes approximately nine months in human.
- Strong rhythmic muscular contractions in the uterus cause child birth to take place if the egg is not fertilised.

L.P. What happens when the egg is not fertilised?
= Menstruation occurs.

⇒ MENSTRUATION:

- Since the ovary releases one egg every month, the uterus also prepares itself every month to receive a fertilised egg. Thus, its lining becomes thick and spongy.
- If egg is not fertilised, it lives for about one day. Now however, this lining is not needed any longer. So, the lining slowly breaks and comes out through the vagina as blood and mucus.
- This cycle takes place roughly every month and is known as menstruation. It usually lasts for about two to eight days.

Reproductive Health: The state of physical, mental and social fitness to lead a healthy reproductive life.

BIRTH CONTROL

↳ If a woman is not ready for pregnancy, her health will be adversely affected. There are many ways to avoid pregnancy and this prevention of pregnancy is called **contraception or birth control**.

- Condom on the penis or similar covering worn in the vagina which acts as mechanical barrier so that sperm does not reach egg.
- **Chemical Method**: Drugs are taken orally as pills to change the hormonal balance of the body so that eggs are not released and fertilisation cannot occur. They can cause side effects too.
- Loop or the copper-T are placed in the uterus to prevent pregnancy. They can cause side effects due to irritation of uterus.
- **Surgical Method**:
If the vas deferens in the male is blocked, sperm transfer will be prevented. If fallopian tube in the female is blocked, the egg will not be able to reach the uterus. In both cases fertilisation will not take place. Surgical methods can be used to make such blocks.

K³B The diseases which can be transmitted from an infected person to a healthy person through sexual contact are known as **Sexually Transmitted Diseases (STD)**.
eg:- → AIDS (Acquired Immuno Deficiency Syndrome).
→ Genetal Warts
→ Gonorrhoea etc.

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In notes ko padhkar is
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